



**MICROPROCESSOR-BASED  
PACKING CONTROLLER  
WITH  
BUILT-IN THERMOREGULATORS**

**PACK11aCON v2**



**TECHNICAL DESCRIPTION  
AND  
INSTRUCTION FOR USAGE**

PLOVDIV 2013

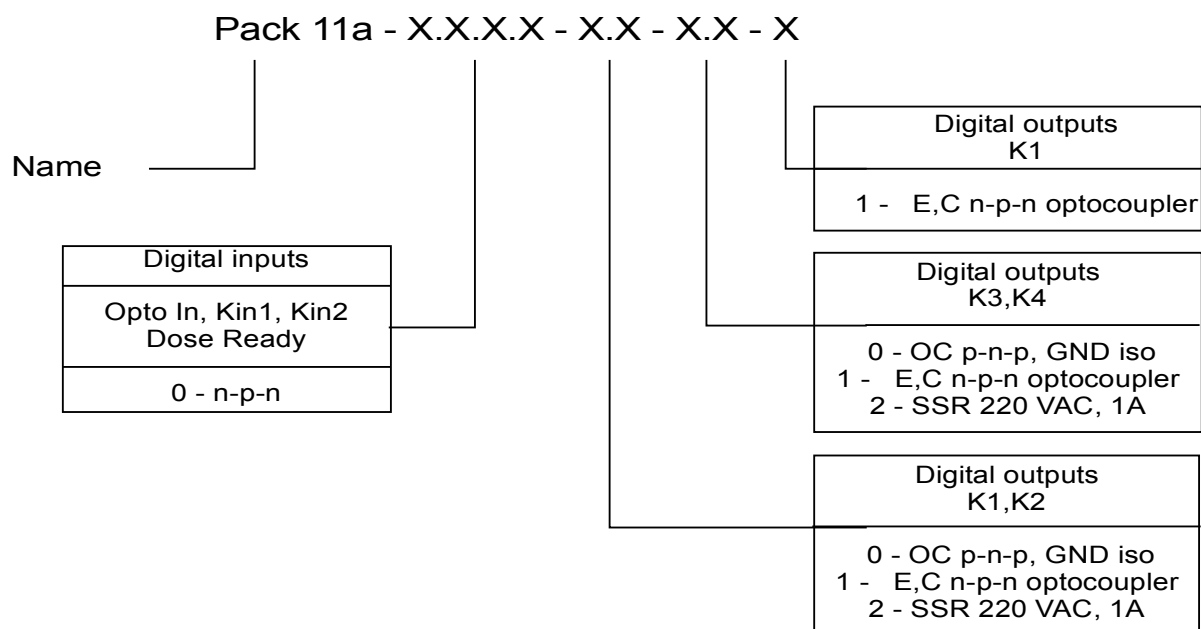
Current revision replaces Document 2001-xx-xx

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- **Current revision replaces Document 2001-xx-xx**
- **Version Pack11aCon v2 differs significantly in terminals and their marking from previous versions. Watch out for incorrect connection!**

## I. ORDER CODE



### Example

**Pack11a - 0.0.0.0 - 0.0 - 2.2 - 1.**

Digital inputs	- n-p-n
Digital outputs K1, K2	- OC n-p-n, +V iso
Digital outputs K3, K4	- SSR 220V AC, 1 A
Digital outputs K5	- E, C n-p-n optocoupler

## II. ADVANTAGES

- *Compact design that provides control of whole machine cycle*
- *Ability to work with weight or auger dispensers*
- *Two built-in proportional temperature controllers*
- *Galvanically isolated from the measurement and controlling parts inputs and outputs*
- *9 built-in individual counters for different Operators and Total counter*
- *Built-in counter for packages in box with function intermediate Stop*
- *Operation with photo marker or by time for operation with foil without a marker*
- *Auxiliary power supply for optical and inductive sensors, for SSR etc.*
- *Protection from self-switching on when the power supply failure is restored*

## III. DESIGNATION

Microprocessor-based packing controller PACK11aCON v2 is designed to control packing machine with motor drive for pulling and gluing the foil with optical sensor for the length of the pack or without (by time). PACK11aCON v2 also regulates the temperature of the horizontal and vertical jaws and can operate with or without weight controller.

The device has non-volatile memory in which are stored setting, data readings before the power supply failure and the step from the packing in which it was located.

## IV. FEATURES

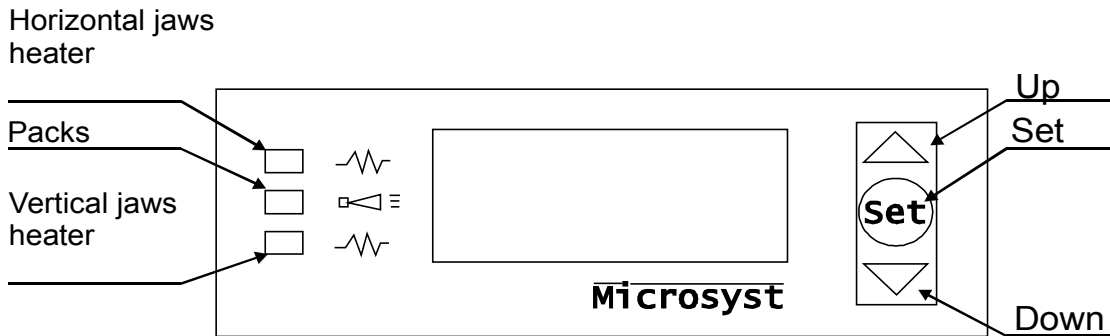
- In case of power supply failure the setting, the accumulated values and the stage of algorithm in which the machine was before power supply failure are remembered.
- When the power supply is switched on it is waiting for “Start”.
- By pressing the “Stop” button the machine stops and remains in the position in which it was at the time of pressing the “Stop” button.
- The digital inputs and outputs are galvanically isolated from the measurement temperature part and from the microcontroller but are not isolated from one another.
- Upon reaching the set number of packs per box the controller stops and waits the signal “Stop” to appear, after loading a new box. For a given number – 0 the function is turned off and the machine operates in continuous mode.

## V. TECHNICAL DATA

DIGITAL INPUTS				
1.	Input	Active when connected to /according to the sensor type from order code/		Active according to the microcontroller /Only for service information/
		n-p-n	p-n-p	
1.	Kin 1	GND iso	+ Viso	(active at rising edge)
	Kin 2			(active at rising edge)
	Opto In			(active at 1)
	Dose Ready			(active at 0)
	START	GND iso		(active at 0)
	STOP	GND iso		(active at 0)
DIGITAL OUTPUTS				
2.	Outputs	Variant I	Variant II	Variant III
	K1	Output Emitter and Collector of n-p-n transistor of optocoupler max 30 V / 50mA DC	OC – open collector n-p-n transistor and +Viso max 30 V / 50mA DC	SSR-220 V AC / 1A
	K2		OC – open collector n-p-n transistor and +Viso max 30 V / 50mA DC	SSR-220 V AC / 1A
	K3		OC – open collector p-n-p transistor and GND iso max 60 V / 500mA DC	SSR-220 V AC / 1A
	K4		OC – open collector p-n-p transistor and GND iso max 60 V / 500mA DC	SSR-220 V AC / 1A
	K5		Output Emitter and Collector of n-p-n transistor of optocoupler max 30 V / 50mA DC	Output Emitter and Collector of n-p-n transistor of optocoupler max 30 V / 50mA DC
ANALOG INPUTS – temperature sensors				
3.	Channel	Sensor	Connection	Range
	CH1	Pt 100 DIN IEC 751 Cl.B	2-wire	0 ÷ 400° C
	CH2			
4.	Range of sampling of the total packages counter			99999999
5.	Display			2x8 LCD
6.	Keyboard			membrane
7.	Overall dimensions(WxHxL) mm			96 x 48 x 128
8.	Weight			max. 200 g
9.	Power supply			220 V AC
10.	Power supply frequency			50 Hz (±1 Hz)
11.	Operating temperature			0 ÷ 50 °C
12.	Operating relative humidity			20 ÷ 80 % rh

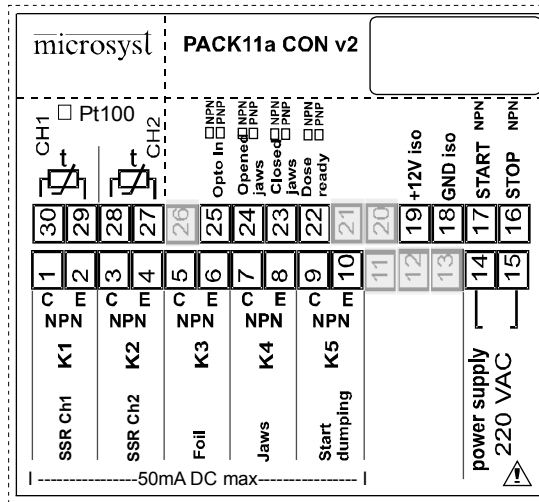
## VI. FRONT AND BACK PANEL. CONNECTION. LEDs

### 1. DISPLAY AND KEYBOARD

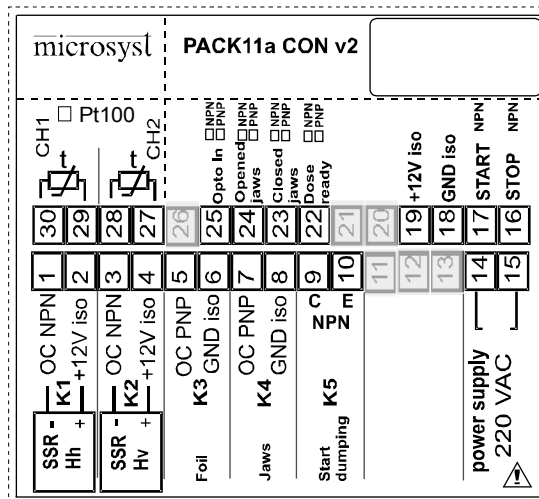


### 2. BACK PANEL

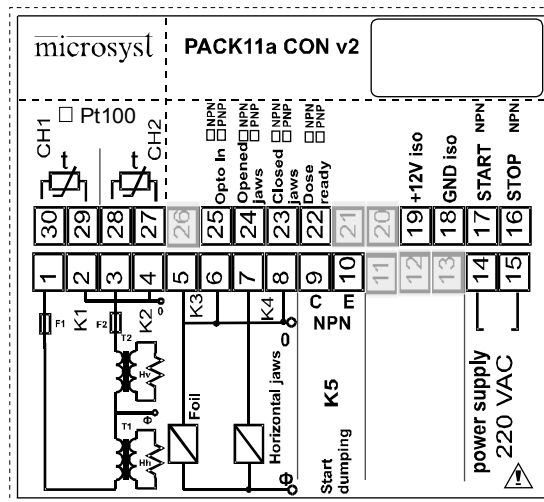
- Variant I – Digital outputs from n-p-n transistor of optocoupler



- Variant II – more powerful transistor outputs



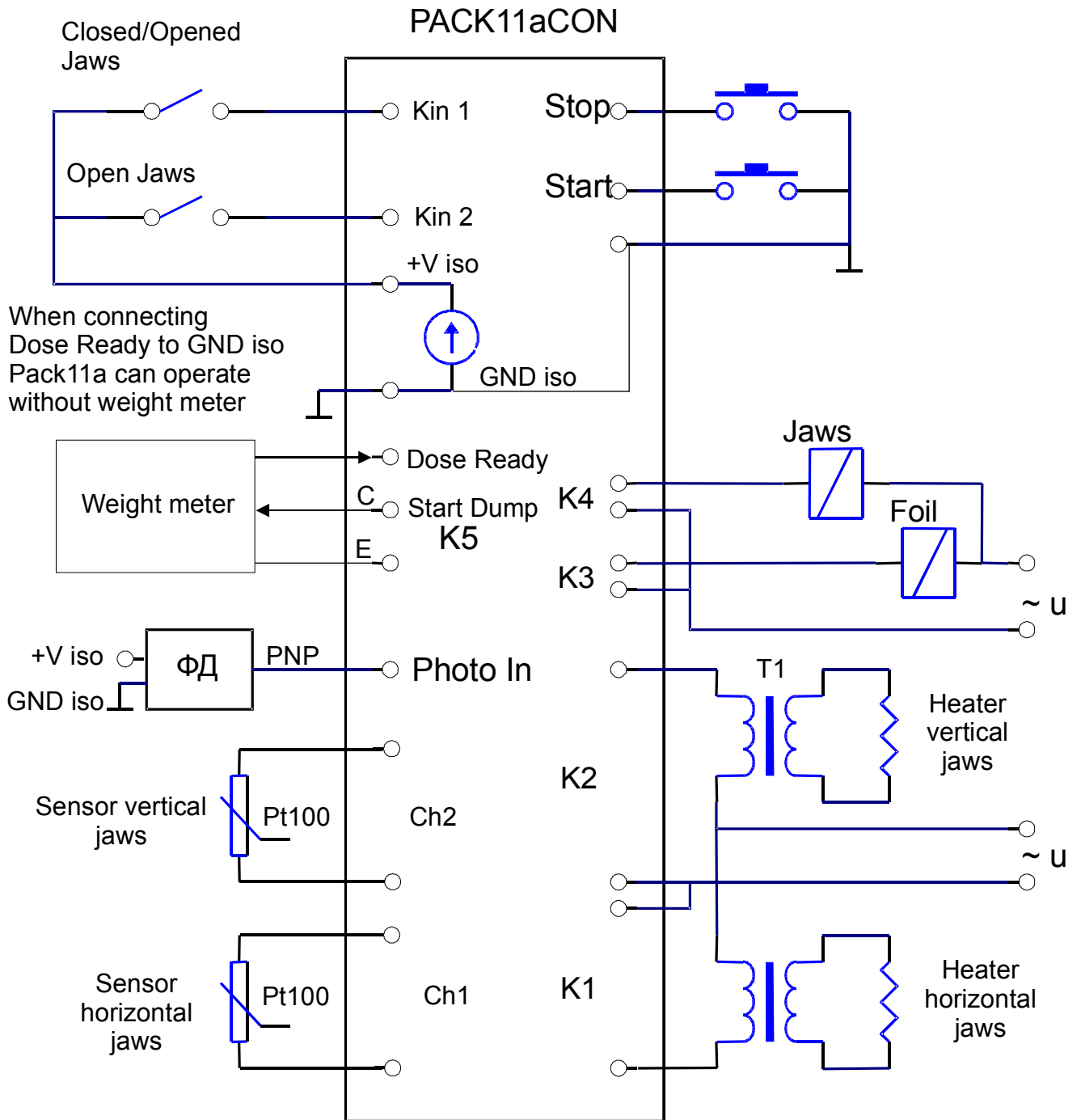
- Variant III - built-in SSR



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<b>CH1</b>	Input for temperature sensor of horizontal jaws
<b>CH2</b>	Input for temperature sensor of vertical jaws
<b>Kin 1</b>	Input for sensor for open/closed horizontal jaws
<b>Kin 2</b>	Input for sensor for closed horizontal jaws (if it is allowed)
<b>Dose Ready</b>	Ready dose – input for signal weighted dose, from scales
<b>Start</b>	Start button
<b>Stop</b>	Stop button
<b>Opto In</b>	Input for optical sensor
<b>K1</b>	Output controlling the heater of the horizontal jaws
<b>K2</b>	Output controlling the heater of the vertical jaws
<b>K3</b>	Output controlling the motor for pulling the foil
<b>K4</b>	Output controlling horizontal and vertical jaws
<b>K5</b>	Output for starting the dose dump
<b>+V iso</b>	auxiliary power supply for digital inputs, outputs, SSR etc.
<b>GND iso</b>	Ground to +V iso.

### 3. ELECTRICAL CONNECTION.

Example variant with outputs SSR and n-p-n inputs.



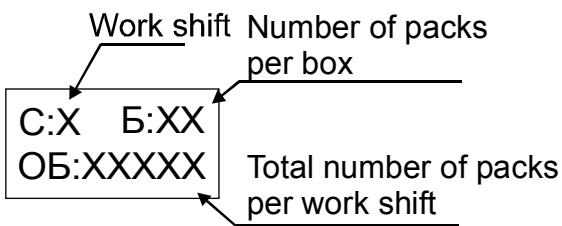
## VII. MAIN SCREENS AND OPERATION MODES

PACK11aCON controls packing machines with motor drive, with or without optical sensor for package length and with one or two sensors for the jaws position.

The device controls the temperature of the horizontal and vertical jaws and synchronize its work with weight meter.

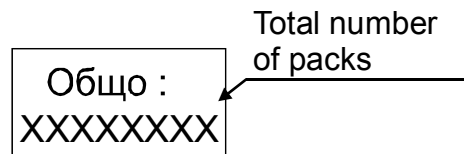
The controller has three operating displays – operating, total and temperature counter, and transition between different displays can be made by “Up” or “Down” buttons.

### Operating counter

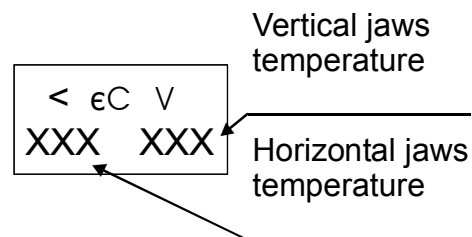


Number of packs per box shows remaining packs from the box. By pressing the “Set” button set number of packs appears on the display.

### Total counter



### Temperature counter



By pressing the “Set” button set temperatures appear on the display.



## VIII. OPERATION ALGORITHM

After switching on the power supply “Crapr PAK11a” appears on the display (for 3s), after that appears the main screen and wait to start with switched off motors.

After pressing the “Start” button, PACK11aCON starts from the position where it was stopped.

Algorithms for packing a package are different according to the value of parameter t

Bonding:

### **t Bonding equal to 0 – operating with one sensor for jaws position**

- 1) Starts the motor for pulling the foil (K3)
- 2) Waits signal from optical sensor or expiration of time (t Пакет), if there is no sensor
- 3) Stops the motor for pulling the foil (K3)
- 4) Waits for signal from weight meter for weighted dose (Dose Ready)
- 5) Starts the motor for jaws control (K4)
- 6) Waits for signal from inductive sensor 1 (Kin 1)
- 7) Stops the motor for jaws control (K4)
- 8) Signals to the weight meter, for dumping start
- 9) Counts a package and if not reached the set number of box goes to 1, otherwise it stops and waits a new start

### **t Bonding different from 0 – operation with one or two sensors for jaws position**

- 1) Starts the motor for pulling the foil (K3)
- 2) Waits signal from optical sensor or expiration of time (t Пакет), if there is no sensor
- 3) Stops the motor for pulling the foil (K3)
- 4) Waits for signal from weight meter for weighted dose (Dose Ready)
- 5) Starts the motor for jaws control (K2) - closing
- 6) Waits for signal for closed jaws, if inductive sensor 2 is allowed – from inductive sensor 2 (Kin 2), if it is not allowed – from inductive sensor 1 (Kin 1)
- 7) Stops the motor for jaws control (K4)
- 8) Waits time for bonding t Лепене
- 9) Starts the motor for jaws control (K4) – opening and signals the weight meter for dumping start
- 10) Waits for signal for open jaws from inductive sensor 1 (Kin 1)
- 11) Stops the motor for jaws control (K4)
- 12) Counts a package and if not reached the set number of box goes to 1, otherwise it stops and waits a new start

**! By pressing the “Stop” button the machine stops and remains in the position in which it was at the time of pressing the “Stop” button.**

### **Power supply failure**

In case of power supply failure the setting, the accumulated values and the stage from the algorithm in which the machine was before power supply failure are remembered. After the power supply is switched on it waits for start.

## IX. PARAMETERS EDITING

When you change the parameters the “Set” button is used for confirmation and/or transition to the next parameter, and “Up” and “Down” buttons are used to change the value

### 1. SYSTEM PARAMETERS EDITING

Editing of system parameters is possible after entering in “Системно Меню”. It can be done in two ways:

- By pressing the “Set” button when the power supply is switched on. In this way of entry in the system menu are available so-called secret parameters.
- By pressing and holding the “Set” button for 5s., but when the Total counter appears on the display only. In this way of entry in the system menu, if before that there was no entry in it by pressing the “Set” button when the power supply is switched on, the secret parameters are not available.

#### System parameters

Name	Description	Values
ФотоДат?	Choosing to work with or without optical sensor *	1 – there is an optical sensor 0 – there is no optical sensor
t Пакет	Foil time to move It appears only in operation without optical sensor	(1 ÷ 255) x 0,1s
Инд. Д2?	Choosing to work with or without inductive sensor 2 *	1 – there is an inductive sensor 2 0 – there is no inductive sensor 2
t Лепене	Bonding time	(0 ÷ 255) x 0,1s
Name	Description	Values
Зона Ch1	Zone of action of P-PWM control of the horizontal jaws * $K_3 = (t_{и} / T_{шим}) = Dt / \text{Зона Ch1}$ Dt – deviation from the set-point within the zone of action	(0 ÷ 999)°C until the set-point
Зона Ch2	Zone of action of P-PWM control of the vertical jaws * $K_3 = (t_{и} / T_{шим}) = Dt / \text{Зона Ch1}$ Dt – deviation from the set-point within the zone of action	(0 ÷ 999)°C until the set-point
Период 1	Period of PWM *	(1 ÷ 255) x 0,5s
Период 2	Period of PWM *	(1 ÷ 255) x 0,5s
Филтър 1	Coefficient of the analog filter of the thermochannel of the horizontal jaws *	1 ÷ 127
Филтър 2	Coefficient of the analog filter of the thermochannel of the vertical jaws *	1 ÷ 127
Скок Ф1	Squelch level *	(0 ÷ 255)°C
Скок Ф2	Squelch level *	(0 ÷ 255)°C
t Скок 1	Maximum duration of the noise *	(0 ÷ 255) x 0,5s
t Скок 2	Maximum duration of the noise *	(0 ÷ 255) x 0,5s

\* Secret parameter

## 2. OPERATION PARAMETERS EDITING

### **Change of the work shift (operator) and/or the number of packs per box**

When you are in operating display press and hold the “Set” button for 5s. and flashing tag appears on the value to be changed.

Name	Description	Values
С:	Shift number	1 ÷ 9
Б:	Number of packs per box **	0 ÷ 99

\*\* For a given number 0 the controller stops only after button “Stop”

### **Change of jaws temperature set-point**

When you are in temperature display press and hold for 5s the “Set” button, and flashing tag appears on the value to be changed.

## 3. TOTAL COUNTER RESET

When you are in total counter display press and hold the “Set” button to display “Системно Меню”. Without releasing the “Set” button press and hold the “Down” button, the “Set” button have to be released first and then the “Down” button. “Изчисти Общо Бр?” appears on the display. Press “Set” to confirm or “Down” or “Up” to cancel.

## X. **ACTIONS AGAINST INTERFERENCE**

The controller is designed in accordance with EMC requirements. There are hardware and software measures for this purpose. However it is desirable to comply with the minimum requirements for connecting to the other periphery.

- If shielded cable is used to connect to the temperature sensors, the shield have to be connected only from the one end of the cable to grounding bus of the power supply
- Wires that transmit a similar type of signals can be packed together, but if the signals are different, the wires must be separated to prevent electromagnetic interaction
- When there have to be crossed wires with different signal types this must be done at an angle of 90 degrees and a long distance
- Wires which carry weak signals and wires connecting the sensors with the controller must not be near contactors, motors, generators, radios and wires, which carry large currents
- If it is necessary to suppress possible noise in temperature channels, can be used the built-in software filters in the controller.

### WARRANTY CARD

Warranty Card № : .....

Warranty : ..... months

Serial number : .....

The product is bought by : .....

with invoice № № : ...../..... 20.....

### WARRANTY CONDITIONS

The warranty is valid only if this warranty card is filled legibly in ink, signed and stamped.

The warranty consists of free repair of all manufacturing defects that can occur during the warranty period. **The repair is done by presenting of this warranty card in the service base with which is bought the product.** The warranty does not cover damage caused by poor transport, poor storage, incorrect usage, forces of nature, failure to follow instructions and when others made an attempt to remove the defects. In these cases the defect can only be removed for a fee.

Service during the warranty period and settlement of claims is done under the current legislation.

### REPAIRS MADE IN THE SERVICE BASE

Service	Data of entry	Order number	Type of the repair	Date of delivery	Performer of the repair

Seller: .....

Buyer: .....

Bulgaria, 4000 Plovdiv, 4 Murgash str.  
Tel.: (+359 32) 642 519, 640 446 fax: (+359 32) 640 446  
[www.microsyst.net](http://www.microsyst.net) e-mail: [info@microsyst.net](mailto:info@microsyst.net)